**PRELIMINARY DETERMINATION OF COMPLIANCE**
**ENGINEERING EVALUATION OF APPLICATION NO. 1889**
**UNITED GOLDEN GATE POWER PLANT**
**PLANT #12809**

## Background:

United Golden Gate Power Project LLC (UGGPP) is proposing to construct a 51-megawatt peaking power plant. The facility will consist of a simple-cycle, gas-fired combustion turbine and will be located at the San Francisco International Airport, San Mateo County, California.

### Facility Description (Location, Industry, and Ownership):

The UGGPP site is located within the area of the San Francisco International Airport. The site is approximately 14 acres in size and located along North Access Road, adjacent to the existing United Cogeneration, Inc. (UCI) facility site and the United Airlines Maintenance Operations Center.

According to the applicant, UGGPP LLC is an affiliate of El Paso Merchant Energy. Although UGGPP eventually may have other members (i.e. owners) besides El Paso Merchant Energy, the UGGPP will not be owned or controlled by United Airlines or its affiliates. Neither UGGPP nor its members own or control any other properties, buildings, structures or installations on one or more contiguous or adjacent properties to the proposed UGGPP site. El Paso Merchant Energy is an affiliate of El Paso Energy Corporation. El Paso Energy does not control any other facilities within the jurisdiction of the BAAQMD. El Paso Energy does hold a minority, non-operating interest in the Crockett Cogeneration facility.

The UGGPP will generate electricity for sale into the electrical grid. The 51-megawatt peaking facility will be dispatched under contract with the California Independent System Operator (ISO) until the remainder of the UGGPP facility commences operation. UGGPP Phase I will supply electricity during times of peak summer and winter demand.

### Project Description:

This project is the first phase of the UGGPP, which will ultimately be a combined-cycle merchant power plant with an electrical generation capacity of approximately 570 megawatts (MW). UGGPP Phase I will consist of the following equipment proposed for installation/operation at their facility:

**S-1 Gas Turbine, General Electric LM 6000, natural gas fired, 51 MW net simple-cycle, maximum heat input rating is 450 MMBtu/hour; abated by A-1 Oxidation Catalyst, and A-2 Selective Catalytic Reduction System.**

According to the applicant, they will submit a separate permit application to the District for UGGPP Phase II shortly. Under Phase II, the UGGPP will be expanded to a 570 MW facility that will include two combined-cycle "F" class combustion gas turbines in a two-on-one combined cycle configuration. Additionally, the LM-6000 will be converted from a simple-cycle unit, to a combined-cycle unit. The expansion of the UGGPP will be subject to review under the California Energy Commission's (CEC's) power plant siting regulations.

On September 29, 2000, El Paso Merchant Energy submitted an Application for Certification (AFC) for UGGPP Phase I to the CEC. The CEC has assigned the project Docket No. 00-AFC-05 and conducted a hearing for data adequacy on October 25, 2000. The CEC site certification process is functionally equivalent to the environmental review required under the California Environmental Quality Act (CEQA). As such, the CEC will act as the CEQA Lead Agency.

UGGPP is seeking approval to construct Phase I of UGGPP under the expedited permitting process of Section 25552 of the Public Resources Code. The section was enacted in September 2000 and provides for a four-month certification process for simple-cycle thermal power plants and related facilities that can be put into service by August 1, 2001.

The CEC is reviewing this project under an accelerated schedule in accordance with AB 970. Under this schedule, the CEC has asked for a Preliminary Determination of Compliance (PDOC) from us by December 22, 2000. *As such, this application must be processed as expeditiously as possible.*

UGGPP is requesting that operation of the simple-cycle LM-6000 proposed under UGGPP Phase I be limited to 24 hours per day and 4,000 hours per year. Also, they request 125 hours per year of non-baseload (startup/shutdown) operation. They do not expect to operate at reduced loads, except during startup or shutdown sequences.

## Emission Calculations:

### Worst-Case Hourly Emission Estimates from the Turbine Vendor:

The District and the California Energy Commission (CEC) were presented with baseload hourly emission estimates by the applicant from S&S Energy Products, a General Electric Power Systems Business (GE/SSEP). The most recent data submitted to the CEC by the applicant is contained in their Data Request Responses #2, Appendix M-3, dated December 2000 at an average ambient temperature of 40 degrees F. The highest estimated emissions occur at the lowest average ambient temperatures.

Manufacturer's data for baseload operation was adjusted to account for emissions controls and vendor guarantee contingency factors.

**GE/SSEP Baseload Hourly Emissions Estimates**

| NOx | POC | PM10 | CO | SO2 |
|---|---|---|---|---|
| 6.5 lb/hr | 1.0 lb/hr | 3.14 lb/hr | 7.9 lb/hr | 1.34 lb/hr |
| 3.0 ppmvd @15% O2 | 1.6 ppmvd @ 15% O2 | N/A | 6.0 ppmvd @15% O2 | N/A |

The start-up/shutdown (non-baseload) data is based on information provided by the manufacturer and submitted to the CEC (Data Request Response #2, Item #19, dated 12/15/00). A start-up is anticipated to take an average of ten minutes for a simple-cycle turbine. Hourly and start-up emission estimates were provided to the applicant from S&S Energy Products, a General Electric Power Systems Business. District and CEC staff have reviewed these emission estimates and concur with the values submitted and calculated.

**General Electric Start-up/Stop Emissions, lb-turbine/hour-start/stop**

| NOx | POC | PM10 | CO | SO2 |
|---|---|---|---|---|
| 7.7 | 0.68 | 3.14 | 7.7 | 1.30 |

**Theoretical Hourly Emission Rates based on Allowable BACT Concentration Emission Limits (at 100% load):**

NOx, CO, POC, and ammonia are all limited by BACT and permit conditions to not exceed certain exhaust concentrations. Therefore, the hourly emissions are theoretically limited by the BACT limits for these pollutants. BACT for SO2 and PM10 is the exclusive use of clean-burning natural gas. The exhaust concentration, in ppmv, is not specifically limited for SO2 and PM10, so the hourly emission rate will be taken to be those values provided by General Electric and will be confirmed by source test.

The applicant has requested a NOx emission limit of 3.0 ppmv. The NOx emissions from the turbine will be limited by permit condition to 3.0 ppmv, dry @ 15% O2 and will be achieved by using selective catalytic reduction with ammonia injection. This concentration is converted to a mass emission factor as follows:

(3.0 ppmvd)(20.95-0)/(20.95 – 15) = 10.56 ppmv NOx, dry @ 0% O2

(10.56/1,000,000)(1 lbmol/385.3 dscf)(46.01 lb NO2/lbmol)(8600 dscf/MMBtu)
= 0.0108 lb NO2/MMBtu

The NOx mass emission rate based on the maximum firing rate of the turbine is calculated as follows:

(0.0108 lb NO2/MMBtu)(450 MMBtu/hr) = **4.9 lb NO2/hr**

Similarly,

The CO emissions from the turbine will be limited by permit condition to 10.0 ppmv, dry @ 15% O2 and will be achieved by using an oxidation catalyst. The CO mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 6.0 ppmvd @ 15% O2:

(0.013203 lb CO/MMBtu)(450 MMBtu/hr) = **5.9 lb CO/hr**

The POC emission from the turbine will be limited by permit condition to 2.0 ppmv, dry @ 15% O2 and will be achieved by using an oxidation catalyst. The POC mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 2.0 ppmvd @ 15% O2:

(0.002515 lb POC/MMBtu)(450 MMBtu/hr) = **1.1 lb POC/hr**

The ammonia (NH3) mass emission rate from the turbine will be limited by permit condition to 10.0 ppmv, dry @ 15% O2 and will be achieved by operator control of the ammonia injection rates and proper SCR operation. The NH3 mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 10.0 ppmv @ 15% O2:

(0.013 lb NH3/MMBtu)(450 MMBtu/hr) = **6.0 lb NH3/hr**

**Maximum Daily Emissions, lb/day:**

Maximum daily emissions are estimated based on 24 hours of worst-case emission rates. The worst-case daily emission rate is maximized on a day, which includes a startup/shutdown, with the balance of the daily operations based on 100% load at 40 degrees F. The worst-case baseload hourly emission estimates are taken to be the higher of either: the worst-case hourly emission estimates from the turbine vendor or the theoretical hourly emission rates based on allowable BACT concentration emission limits at 100% load. The non-baseload hourly emission estimates are based on the emission estimates provided by the turbine vendor, which have been reviewed by the CEC staff and District staff.

NOx = (7.7 lb/hr-start/stop)(1 start) + (6.5 lb/hr-baseload)(23 hr) = 157.2 lb/day NOx

CO = (7.7 lb/hr-start/stop)(1 start) + (7.9 lb/hr-baseload)(23 hr) = 189.4 lb/day CO

POC = (0.68 lb/hr-start/stop)(1 start) + (1.1 lb/hr-baseload)(23 hr) = 26.0 lb/day POC

PM10 = (3.14 lb/hr-start/stop)(1 start) + (3.14 lb/hr-baseload)(23 hr) = 75.4 lb/day PM10

SO2 = (1.30 lb/hr-start/stop)(1 start) + (1.34 lb/hr-baseload)(23 hr) = 32.1 lb/day SO2

**Annual Emissions, tons/year:**

Per the 10/16/00 letter from the applicant, they are requesting operation limited to 24 hours/day and 4000 total hours/year and 125 hours of startup/shutdown (non-baseload operation). The annual average emission rates are calculated based on baseload operation at an average ambient temperature of 59 degrees F.

NOx emissions calculation:
[(6.3 lb/hr)(3875 hours/yr) + (7.7 lb/hr-start-stop)(125 hours/yr)](1 ton/2000 lb) = 12.7 tons/yr NOx

POC emissions calculation:
[(0.7 lb/hr)(3875 hours/yr) + (0.68 lb/hr-start-stop)(125 hours/yr)](1 ton/2000 lb) = 1.4 tons/yr POC

PM10 emissions calculation:
[(3.05 lb/hr)(3875 hours/yr) + (3.14 lb/hr-start-stop)(125 hours/yr)](1 ton/2000 lb) = 6.1 tons/yr PM10

CO emissions calculation:
[(7.7 lb/hr)(3875 hours/yr) + (7.7 lb/hr-start-stop)(125 hours/yr)](1 ton/2000 lb) = 15.4 tons/yr CO

SO2 emissions calculation:
[(1.30 lb/hr)(3875 hours/yr) + (1.30 lb/start-stop)(125 hours/yr)](1 ton/2000 lb) = 2.6 tons/yr SO2

**Permitted Maximum Annual Emissions, tons/yr**

| **NOx** | **POC** | **PM10** | **CO** | **SO2** |
|---|---|---|---|---|
| 12.7 | 1.4 | 6.1 | 15.4 | 2.6 |

**Compliance Determination:**

The following section summarizes the applicable District Rules and Regulations and describes how the proposed project will comply with those requirements.

# A. Regulation 2, Rule 2; New Source Review

The primary requirements of New Source Review that apply to the proposed UGGPP facility are Section 2-2-301; "Best Available Control Technology Requirement", Section 2-2-302; "Offset Requirements, Precursor Organic Compounds and Nitrogen Oxides, NSR", and Section 2-2-303; "Offset Requirement, $PM_{10}$ and Sulfur Dioxide, NSR" and Section 2-2-404, "PSD Air Quality Analysis".

## Best Available Control Technology (BACT) Determinations

The following section includes BACT determinations by pollutant for the permitted sources of the proposed project.

### Air Pollution Control Strategies and Equipment

The proposed facility includes a source that triggers the Best Available Control Technology (BACT) requirement of New Source Review (District Regulation 2, Rule 2, NSR) for emissions of nitrogen oxides ($NO_x$), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide ($SO_2$), and particulate matter of less than 10 microns in diameter ($PM_{10}$) because its emissions of these pollutants are above 10 pounds per highest day.

The NOx, CO, and oxygen concentrations will be monitored continuously using a continuous emissions monitor (CEM). Therefore, emission concentrations of NOx and CO will be limited to parts per million (ppm) emissions concentrations in the permit conditions.

### Nitrogen Oxides ($NO_x$)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT1 (technologically feasible/cost-effective) for $NO_x$ for a simple-cycle gas turbine with a power rating $\geq$ 50 MW as $NO_x$ emissions < 5.0 ppmvd @ 15% $O_2$, achieved through the use of Selective Catalytic Reduction (SCR) with ammonia injection in conjunction with combustion modifications. BACT2 (achieved in practice) is $\leq$ 5.0 ppmvd @15% O2.

Two relatively new technologies are capable of controlling NOx emissions from a gas turbine to 2 ppmv or below. These are SCONOx, manufactured by Goal Line Environmental Technologies, and XONON, manufactured by Catalytica, Inc. The District has reviewed these technologies to determine if they are appropriate for this application. It appears that while both of these innovative approaches to emission control show great promise for the future, and may currently be appropriate for other types of projects, neither option can be considered

"technologically feasible" or "achieved in practice" for the type and size of equipment to be installed for this project.

SCONOx is the more established of the two technologies. This system uses a potassium carbonate coated catalyst to remove both NOx and CO, without the use a reagent such as ammonia. There is one system in commercial operation on a gas turbine of comparable size to this project.

However, SCONOx is installed on a combined-cycle electrical generation system, which typically has outlet temperatures below 400 degrees F. This project will be a simple-cycle system, with outlet temperatures exceeding 850 degrees F. We are not aware of any SCONOx applications on turbines with outlet temperatures that high, and Goal Line's Technical Paper describing the system lists acceptable temperature range as 300 to 700 degrees F. Based on this information, we do not believe that SCONOx represents a technologically feasible control option for this project.

XONON, developed by Catalytica, Inc., is another promising new technology for NOx emissions control. This technology uses a flameless catalyst located inside the combustion chamber itself, which allows for the combustion reaction to proceed at a lower temperature than in conventional turbines, thus preventing the formation of NOx.

At the present time, the commercial availability of this technology is extremely limited. To date, was are aware of only one application, a 1.5 MW turbine in Santa Clara, California. There is no information available regarding the operation of such a system on a turbine the size of the one to be installed at this project, which is over 30 times larger. Based on this information, we do not believe that XONON represents a technologically feasible control option for this project.

Water will be injected into the turbine combustor to reduce NOx emissions at the combustor exhaust. Aqueous ammonia is injected into the SCR catalyst to control exiting stack emissions to less than 3.0 ppmvd NOx @ 15% O2. The ammonia slip will be limited by permit condition to 10.0 ppmv. This seems acceptable because the applicant is proposing to reduce NOx emissions and the averaging times below those levels required by current District BACT, so some allowance for ammonia slip is appropriate. The applicant has requested a NOx limit of 3.0 ppmv. Since SCR, controlling NOx emissions to 3.0 ppmv corrected to 15% oxygen, represents a control technology that is technologically feasible, cost-effective, and achieved in practice in a wide variety of applications, it represents BACT for the project. This will comply with BACT.

**Carbon Monoxide (CO)**

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for CO for a gas turbine with a power rating $\geq$ 50 MW as CO emissions $\leq$ 10.0 ppmvd @ 15% $O_2$, achieved through the use of an oxidation catalyst.

The CO emissions from the combustion turbine will be reduced through the use of an oxidation catalyst to less than 6.0 ppmvd CO @ 15% O2. CO emissions are also minimized through the use of best combustion practices and "clean burning" natural gas. This will comply with BACT.

### Precursor Organic Compounds (POCs)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a power rating $\geq$ 50 MW as POC emissions $\leq$ 2.0 ppmvd @ 15% $O_2$, achieved through the use of an oxidation catalyst.

Because CEMs for organic compounds only measure carbon (as $C_1$), it is not possible to determine non-methane/ethane hydrocarbon concentrations on a real-time basis. As a result, a continuous emission concentration limitation as BACT for POC is not feasible. Therefore, BACT for POC is deemed to be a mass emission rate limitation to be verified by annual source testing. The POC emissions from the combustion turbine will be reduced to less than 2.0 ppmvd through the use of an oxidation catalyst. POC emissions are also minimized through the use of best combustion practices and "clean burning" natural gas.

### Sulfur Dioxide ($SO_2$)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a rated heat input $\geq$ 2.0 MW and < 50 MW as the exclusive use of clean-burning natural gas. The proposed turbines will utilize natural gas exclusively, which will result in minimal $SO_2$ emissions. The gas turbines will utilize natural gas exclusively to minimize $SO_2$ emissions. Because the emission rate of $SO_2$ depends on the sulfur content of the fuel burned and is not dependent upon the burner type or other combustion characteristics, the use of natural gas will result in the lowest possible emission of $SO_2$.

### Particulate Matter ($PM_{10}$)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a rated heat input $\geq$ 2.0 MW and < 50 MW as the exclusive use of clean-burning natural gas. The proposed turbines will utilize natural gas exclusively, which will result in minimal nitrate and sulfate particulate formation. The gas turbines will utilize natural gas exclusively to minimize $PM_{10}$ emissions. $PM_{10}$ emissions are minimized through the use of best combustion practices and "clean burning" natural gas.

## Emission Offsets

### General Requirements

Pursuant to Regulation 2-2-302, federally-enforceable emission reduction credits are required for $NO_x$ emission increases from permitted sources at facilities which will emit 15 tons per year or more on a pollutant-specific basis, however, since the emissions of these pollutants from the Gas Turbine are below 15 tons per year, offsets are not required.

**Permitted Maximum Annual Emissions, tons/yr**

| NOx | POC | PM10 | CO | SO2 |
|---|---|---|---|---|
| 12.7 | 1.4 | 6.1 | 15.4 | 2.6 |

## Prevention of Significant Deterioration, PSD

Pursuant to Regulation 2-2-304.1, a PSD air quality analysis is not required because this facility emits less than 100 tons per year NOx, CO, SOx, and PM10. As such, the project is not a new major stationary source and will not be subject to PSD review for those pollutants.

**Publication and Public Comment**

This Preliminary Determination of Compliance (PDOC) is subject to the publication and public comment requirements of sections 2-2-406 and 2-2-407 per section 2-3-404. We will publish and solicit comments made on the PDOC to comply with section 2-4-407 requirements. We will consider all comments made on the PDOC during a 30-day public comment period, and will address all substantial comments made before issuing the Final DOC. In addition, the CEQA Analysis that will be led by the California Energy Commission will include hearings to allow the public to provide their comments on the project.

## CEQA Analysis

For this project, the Lead Agency under the California Environmental Quality Act (CEQA) is the California Energy Commission (CEC). The District will not authorize the installation or operation of any proposed new or modified source, the permitting of which is subject to CEQA, until all of the requirements of CEQA have been satisfied. Per District Regulation 2-1-310, this project is not exempt from the requirements of CEQA because it is not ministerial and it is not an exempted source category.

El Paso Merchant Energy Company (El Paso) filed the original Application for Certification (AFC) for Phase I of the UGGPP on September 29, 2000. On October 18 and 24, El Paso filed supplements to its AFC. On October 25, 2000, the CEC determined that the application was complete. The CEC staff has now begun its independent data discovery and analysis phases. These phases will include a number of public workshops and hearings. Under the terms of Public Resources Code section 25552, the CEC's overall review process must be completed within four months from October 25, 2000, the date that the AFC was determined to be data adequate, unless a later date is agreed to by the CEC and the applicant. As of 12/21/00, the CEC and the applicant have agreed to a completion date of March 7, 2001.

**Environmental Impacts of Ammonia Slip from the Use of SCR:**

Aqueous ammonia will be used as the reagent in the SCR system. Deliveries will be made by tanker trucks and stored in a 4,000-gallon aboveground storage tank. Gas turbines using SCR have typically been limited to 10 ppmv, however single-digit levels for ammonia slip have been proposed and guaranteed by some control equipment vendors for large combined-cycle gas turbines.

In the June 1999 California Air Resources Board (CARB) "Guidelines for Power Plant Siting and Best Available Control Technology", CARB staff state that "To date, Massachusetts has permitted two large gas turbine power plants using SCR with 2 ppmvd ammonia slip limits. Given the potential for health impacts and increase in PM10 and PM2.5, districts should ensure that ammonia emissions are minimized from projects using SCR. They recommend that districts consider establishing ammonia slip levels below 5 ppmvd at 15% oxygen in light of the fact that control equipment vendors have openly guaranteed single-digit levels for ammonia slip."

The District is not aware of any such ammonia slip limits or guarantees for simple-cycle turbines that are required to meet a stringent limit of 3.0 ppmv NOx @ 15% O2, averaged over 1 hour, plus meet the strict limit of 5.0 ppmv ammonia slip. This may be because of the higher SCR temperatures that are encountered for simple-cycle turbine compared to combined-cycle turbines. The single-digit ammonia slip guarantees from SCR vendors in the CARB document are based on large combined-cycle gas turbines, not smaller simple-cycle peaking gas turbines, such as is proposed in this application. To address this issue, a permit condition is proposed that requires that if any substantial data is provided to the District, prior to issuance of the Permit to Operate for this project, that demonstrates that this simple-cycle gas turbine controlled by SCR should be limited to below 10.0 ppmv ammonia slip, the District will adjust the ammonia slip limit in the permit conditions lower as appropriate.

A health risk assessment by the District using air dispersion modeling showed an acute hazard index of 0.03 and a chronic hazard index of 0.004 resulting from the ammonia slip emissions. In accordance with the District Toxic Risk Management Policy and currently accepted practice, an acute hazard index of less than 1.0 and a chronic hazard index of less than 1.0 are considered acceptable. Therefore, the toxic impact of the ammonia slip resulting from the use of SCR is deemed to be not significant and is not a sufficient reason to eliminate SCR as a control alternative.

The ammonia emissions resulting from the use of SCR may have another environmental impact through its potential to form secondary particulate matter such as ammonium nitrate. Because of the complex nature of the chemical reactions and dynamics involved in the formation of secondary particulate, it is difficult to estimate the amount of secondary particulate matter that will be formed from the emission of a given amount of ammonia. However, it is the opinion of the Research and Modeling section of the District's Planning Division, that the formation of ammonium nitrate in the Bay Area air basin is limited by the formation of nitric acid and not

driven by the amount of ammonia in the atmosphere. Therefore, ammonia emissions from the proposed SCR system are not expected to contribute significantly to the formation of secondary particulate matter. This potential environmental impact is not considered a sufficient reason to justify the elimination of SCR as a control alternative.

A second potential environmental impact that may result from the use of SCR involves the storage and transport of ammonia. Although ammonia is toxic if swallowed or inhaled and can irritate or burn the skin, eyes, nose, or throat, it is a commonly used material that is typically handled safely and without incident. The applicant will be required to maintain a Risk Management Plan (RMP) and implement a Risk Management Program to prevent accidental releases. The RMP provides information on the hazards of the substance handled at the facility and the programs in place to prevent and respond to accidental releases. The accident prevention and emergency response requirements reflect existing safety regulations and sound industry safety codes and standards. Therefore, the potential environmental impact due to aqueous ammonia storage at this facility does not justify the elimination of SCR as a control alternative.

To fulfill the CEQA-related information requirements of District Regulation 2-1-426.2.6, the applicant has submitted to the District information that shows that the CEC has assumed the role of Lead Agency for this project with respect to CEQA. The application is deemed complete for CEQA purposes.

## B. Toxic Risk Screen

Pursuant to the BAAQMD Risk Management Policy, a health risk screening must be executed to determine the potential impact on public health resulting from the worst-case emissions of toxic air contaminants (TACs) from the project. In accordance with the requirements of the BAAQMD Risk Management Policy and California Air Pollution Control Officers Association (CAPCOA) guidelines, the impact on public health due to the emission of these compounds was assessed utilizing air pollutant dispersion models.

A review of the health risk assessment submitted by the applicant for operation of a gas turbine generator peaking unit was performed by the District's Toxics Evaluation Section (see attached 12/13/00 J. Lundquist memo). The emission rates are calculated based on an operating rate of 0.4558 MMscf/hr, 4000 hours of operation per year and are presented in the 12/13/00 memo. The ammonia emissions shown are based upon a worst-case ammonia emission concentration of 10 ppmvd @ 15% $O_2$ due to ammonia slip from the A-1 SCR System. The rest of the pollutant emissions are calculated using the maximum emission factors from the California Air Toxics Emission Factor (CATEF) database available from the California Air Resources Board (CARB 1996) for gas turbines with COC/SCR controls.

The applicant's submitted modeling does not conform with the protocols for use of the urban land use option. The modeling was performed with a receptor grid spacing of 500 meters. A further refinement using a finer receptor grid spacing around the initial high should also have been performed. The applicant used mean CATEF emission factors to calculate the toxic emissions. However, toxic organic emissions during cold starts and periods of partial loading are expected to be higher due to incomplete combustion. In order to add a measure of conservatism to account for the higher TAC emissions during these periods, which are expected to occur more often for peaking units, the maximum CATEF factors for the gas turbines should used instead of the mean. For these reasons, the risk assessment was performed based on the input data submitted by the applicant for the source, nearby structures and meteorological data.

The results of the District's risk screen are as follows:

| Cancer Risk | Chronic Hazard Index | Acute Hazard Index |
|---|---|---|
| 0.01 in a million | 0.004 | 0.03 |

These levels of risk are not considered significant. Thus, in accordance with the BAAQMD Risk Management Policy, the screen passes. Therefore, the facility is deemed to be in compliance with the BAAQMD Risk Management Policy.

## C. Other Applicable District Rules and Regulations

**Regulation 1, Section 301: Public Nuisance**

None of the project's proposed sources of air contaminants are expected to cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public with respect to any impacts resulting from the emission of air contaminants regulated by the District. In part, the air quality impact analysis is designed to insure that the proposed facility will comply with this Regulation.

**Regulation 2, Rule 1, Sections 301 and 302:**
**Authority to Construct and Permit to Operate**

Pursuant to Regulation 2-1-301 and 2-1-302, the applicant has submitted an application to the District to obtain an Authority to Construct and Permit to Operate for the proposed S-1, Gas Turbine.

**Regulation 2, Rule 3: Power Plants**

Pursuant to Regulation 2-3-101, this rule applies to power plants for which a Notice of Initiation or Application for Certification has been accepted by the California Energy Commission (CEC). On September 29, 2000, El Paso Merchant Energy submitted an Application for Certification

(AFC) for UGGPP Phase I to the CEC. The CEC has assigned the project Docket No. 00-AFC-05 and conducted a hearing for data adequacy on October 25, 2000.

The procedural requirements in Regulation 2, Rule 3 will be met before issuance of the Final Determination of Compliance.

**Regulation 2, Rule 6: Major Facility Review**

Title V of the 1990 Clean Air Act Amendments (CAAA) required States to implement and administer a source-wide operating permit program consistent with the provisions of Title 40, Code of Federal Regulations (CFR), Part 70. The BAAQMD has been delegated authority to administer the Title V program through Rule 2-6.

Per Regulation 2-6-404.1, the responsible officer for a facility subject to the requirements of Section 403 of Regulation 2-6, shall submit an application for a major facility permit to the APCO and to EPA within 12 months after the facility becomes subject to Regulation 2, Rule 6. We have informed the applicant's consultant that they will be required to submit a Title V application in this time frame and their consultant has agreed to comply with this requirement.

**Regulation 2, Rule 7: Acid Rain**

Per the definition of Phase II Acid Rain Facility in Regulation 2-6-217.1, this facility is a Phase II Acid Rain Facility. Regulation 2-6-302 requires that the facility shall undergo major facility review in accordance with the requirements of this rule, even if such facility is not classified as a major facility under Section 2-6-212. All Phase II acid rain facilities shall comply with the requirements of Sections 405, 406, 408, 409, 411, and 412 of this rule.

This project will be subject to the requirements of Title IV of the federal Clean Air Act. The requirements of the Acid Rain Program are outlined in 40 CFR Part 72, 73, and 75. The specifications for the type and operation of continuous emission monitors (CEMs) for pollutants that contribute to the formation of acid rain are given in 40 CFR Part 75.

District Regulation 2, Rule 7 incorporates by reference the provisions of 40 CFR Part 72 and administers the program in concert with the Title V Operating Permits Program (Rule 2-6).

*The facility must obtain, an Acid Rain Permit from the BAAQMD prior to the date on which the unit commences operation.* We have been delegated authority for Acid Rain permits.

The project will be subject to the following general requirements under the acid rain program:

- Duty to apply for an Acid Rain Permit.
- Compliance with SO2 and NOx emission limits.

- Duty to obtain required SO2 allowances.
- Duty to install, operate and certify Continuous Emission Monitoring Systems (CEMs) to demonstrate compliance with the acid rain requirements.

The applicant will secure the required SO2 allowances and will perform the required emission monitoring. Monitoring plans will be submitted as required by EPA rules.

**Regulation 6: Particulate Matter and Visible Emissions**

Through the use of dry low-$NO_x$ burner technology and proper combustion practices, the combustion of natural gas at the proposed gas turbine is not expected to result in visible emissions. Specifically, the facility's combustion sources are expected to comply with Regulation 6, including sections 301 (Ringelmann No. 1 Limitation), 302 (Opacity Limitation) with visible emissions not to exceed 20% opacity, and 310 (Particulate Weight Limitation) with particulate matter emissions of less than 0.15 grains per dry standard cubic foot of exhaust gas volume.

**Regulation 7: Odorous Substances**

Regulation 7-302 prohibits the discharge of odorous substances which remain odorous beyond the facility property line after dilution with four parts odor-free air. Regulation 7-302 limits ammonia emissions to 5000 ppm. Because the ammonia emissions from the proposed SCR system will each be limited by permit condition to 10 ppmvd @ 15% $O_2$, the facility is expected to comply with the requirements of Regulation 7.

**Regulation 9: Inorganic Gaseous Pollutants**

Regulation 9, Rule 1, Sulfur Dioxide

This regulation establishes emission limits for sulfur dioxide from all sources and applies to the combustion sources at this facility. Section 301 (Limitations on Ground Level Concentrations) prohibits emissions which would result in ground level $SO_2$ concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Section 302 (General Emission Limitation) prohibits $SO_2$ emissions in excess of 300 ppm (dry). The gas turbine is not expected to contribute to noncompliance with ground level $SO_2$ concentrations and should easily comply with section 302.

Regulation 9, Rule 3, Nitrogen Oxides from Heat Transfer Operations

The proposed combustion gas turbine shall comply with the Regulation 9-3-303 $NO_x$ limit of 125 ppm with nitrogen oxide emissions of 3.0 ppmvd @ 15% $O_2$.

Regulation 9, Rule 9, Nitrogen Oxides from Stationary Gas Turbines

Because the proposed combustion gas turbine will be limited by permit condition to $NO_x$ emissions of 3.0 ppmvd @ 15% $O_2$, it is expected to comply with the Regulation 9-9-301.3 $NO_x$ limitation of 9 ppmvd @ 15% $O_2$.

Regulation 9, Rule 11, Nitrogen Oxides and Carbon Monoxide from Electric Power Generating Steam Boilers

This rule does not apply because this project does not utilize a boiler.

**Regulation 10: New Source Performance Standards (NSPS)**

This regulation incorporates the federal NSPS.

Subpart A General Provisions provides the general framework for NSPS. Subpart Db Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units does not apply because this project does not utilize duct burners.

Subpart GG Standards of Performance for Stationary Gas Turbines – contains a NOx emission limit in part 60.332 (a)(2) of 50 ppmv at 15% O2, dry, 3-hour average, as well as monitoring and testing requirements for combustion turbines. The project emissions will be well below the applicable NOx emissions limits. The applicant will comply with emission and fuel monitoring requirements, and monitoring plans will be submitted, as required.

**Section 112 of the Clean Air Act, National Emission Standards for Hazardous Air Pollutants (NESHAP)**

These standards are contained in 40 CFR Parts 61 and 63 and are not applicable to the proposed project.

# IV Permit Conditions

**Definitions:**

| | |
|---|---|
| Clock Hour: | Any continuous 60-minute period beginning on the hour. |
| Calendar Day: | Any continuous 24-hour period beginning at 12:00 AM or 0000 hours. |
| Year: | Any consecutive twelve-month period of time |
| Heat Input: | All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf. |

| | |
|---|---|
| Rolling 3-hour period: | Any three-hour period that begins on the hour and does not include start-up or shutdown periods. |
| Firing Hours: | Period of time during which fuel is flowing to a unit, measured in fifteen minute increments. |
| Gas Turbine Start-up Mode: | The first 10 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated; or the amount of time from Gas Turbine fuel flow initiation until the requirements listed in Condition 4 are met, whichever is less. |
| Gas Turbine Shutdown Mode: | The last 10 minutes before fuel flow to the Gas Turbine is terminated; or the amount of time from non-compliance with any requirement listed in Condition 4 until termination of fuel flow to the Gas Turbine, whichever is less. |

**Conditions for the Gas Turbine (S-1)**

1. Source 1 (S-1 Gas Turbine) shall be fired on natural gas exclusively. (Basis: BACT for SO2 and PM10)

2. The heat input rate of S-1 shall not exceed 1,950,000 MMBtu per consecutive 12 month period, higher heating value, and the cumulative turbine start-up and shutdown sequences for these periods shall not exceed a total of 125 hours. (Basis: cumulative increase)

3. S-1 shall be abated by the properly operated and properly maintained A-1 Selective Catalytic Reduction (SCR) unit and the oxidation catalyst, A-2. (BACT for NOx, POC, and CO)

4. The Gas Turbine (S-1) shall comply with requirements (a) through (e) below, except during gas turbine start-up or shutdown.

   (a) The nitrogen oxide emission concentration at emission point P-1 shall not exceed 3.0 ppmv, on a dry basis, corrected to 15% $O_2$, averaged over any 3-hour period, nor 6.5 pounds during any hour. (BACT for $NO_x$)

   (b) The carbon monoxide emission concentration at P-1 shall not exceed 6.0 ppmv, on a dry basis, corrected to 15% $O_2$, averaged over any rolling 3-hour period, nor 7.9 pounds during any hour. (BACT for CO)

   (c) Ammonia ($NH_3$) emission concentrations at P-1 shall not exceed 10.0 ppmv, on a dry basis, corrected to 15% $O_2$, averaged over any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to A-1 SCR System. The correlation between the gas turbine heat input rates, A-1 SCR System ammonia injection rates, and

corresponding ammonia emission concentration at emission point P-1 shall be determined in accordance with Condition 16. Prior to issuance of the Permit to Operate for this project, if substantial data is provided to the District that demonstrates that a lower ammonia slip limit is achieved in practice for a similar-sized natural-gas fired, simple-cycle gas turbine abated by an SCR system, then the District shall reduce the ammonia slip limit below 10.0 ppmv as appropriate. (Toxic Risk Management Policy for $NH_3$, CEQA)

(d) The precursor organic compound emission concentration at P-1 shall not exceed 2.0 ppmv, on a dry basis, corrected to 15% O2, averaged over any rolling 3-hour period, nor 1.0 pounds per hour. (BACT for POC)

(e) Sulfur dioxide (SO2) mass emissions at P-1 shall not exceed 1.34 pounds per hour. (BACT for SO2)

(f) Particulate matter (PM10) mass emissions at P-1 shall not exceed 3.14 pounds per hour, including condensable particulate matter. (BACT for PM10)

5. Emissions from S-1, Gas Turbine, , including emissions generated during gas turbine start-ups, gas turbine shutdowns, shall not exceed the following limits during any consecutive twelve-month period:

| | | |
|---|---|---|
| (a) | 12.7 tons of $NO_x$ (as $NO_2$) per year | (Basis: Cumulative Increase) |
| (b) | 15.4 tons of CO per year | (Basis: Cumulative Increase) |
| (c) | 1.4 tons of POC (as $CH_4$) per year | (Basis: Cumulative Increase) |
| (d) | 6.1 tons of $PM_{10}$ per year | (Basis: Cumulative Increase) |
| (e) | 2.6 tons of $SO_2$ per year | (Basis: Cumulative Increase) |

6. The owner/operator of the United Golden Gate Power Plant (UGGPP) shall demonstrate compliance with Conditions 4 and 5 through the use of properly operated and maintained continuous emission monitors and data recorders.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbine. The owner/operator shall use District-approved methods to calculate heat input rates, mass emission rates, and emission concentrations, summarized for each clock hour and each calendar day.

(Basis: 1-520.1, 9-9-501, BACT, Cumulative Increase)

7. The owner/operator shall demonstrate compliance with Conditions 1 and 2, and 4(a) and 4(b), 5(a) and 5(b), by using properly operated and maintained continuous monitors (during all hours of operation including equipment start-up and shutdown periods) for all of the following parameters:

   (a) Fuel flow rates for S-1.
   (b) Oxygen concentrations, NOx concentrations, and CO concentrations at exhaust point P-1.
   (c) Ammonia injection rate at A-1 SCR System
   (d) Steam injection rate at S-1 Gas Turbine

   The owner/operator shall record all of the above parameters every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, the owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations. The owner/operator will also record the total number of hours of startup and shutdown each day.

   The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

   (e) Heat input rate for S-1
   (f) Corrected NOx concentrations, NOx mass emissions (as NO2), corrected CO concentrations, and CO mass emissions at exhaust point P-1.

8. The District-approved continuous monitors specified in Conditions 6 and 7 shall be installed, calibrated, and operational prior to first firing of the Gas Turbine. After first firing of the turbine, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the resulting range of CO and $NO_x$ emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.

   For the gas turbine, the owner/operator shall record the parameters specified in Condition 7(a) through 7(f) at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

   (a) Total Heat Input Rate for every clock hour and the average hourly Heat Input Rate for every rolling 3-hour period.
   (b) On an hourly basis, the cumulative total Heat Input Rate for each calendar day for the Gas Turbine (S-1).
   (c) The average NOx mass emissions (as NO2), CO mass emissions, and corrected NOx and CO emission concentrations for every clock hour and for every rolling 3-hour period.

(d) On an hourly basis, the cumulative total NOx mass emissions (as NO2) and the cumulative total CO mass emissions, for each calendar day for the Gas Turbine (S-1).
(e) For each calendar day, the average hourly Heat Input Rates, Corrected NOx emission concentrations, NOx mass emissions (as NO2), corrected CO emission concentrations, and CO mass emissions for the Gas Turbine.
(f) On a daily basis, the cumulative total NOx mass emissions (as NO2) and cumulative total CO mass emissions, for the previous consecutive twelve month period for the Gas Turbine.

(Basis: 1-520.1, 9-9-501, BACT, Offsets, NSPS, PSD, Cumulative Increase)

9. To demonstrate compliance with Conditions 4(d) through 4(f), and 5(c) through 5(e), the owner/operator shall calculate and record on a daily basis, the Precursor Organic Compound (POC) mass emissions, Fine Particulate Matter (PM10) mass emissions (including condensable particulate matter), and Sulfur Dioxide (SO2) mass emissions from P-1. The owner/operator shall use the actual Heat Input Rates calculated pursuant to Condition 6 and 7, actual Gas Turbine Start-up Times, actual Gas Turbine Shutdown Times, and District-approved emission factors to calculate these emissions. The calculated emissions shall be presented for each calendar day, POC, PM10, and SO2 emissions shall be summarized for S-1 Gas Turbine.

(Basis: Offsets, Cumulative Increase)

10. The owner/operator of the UGGPP shall obtain approval for all source test procedures from the District's Source Test Section prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the owner/operator shall measure the contribution of condensable PM (back half) to the total $PM_{10}$ emissions. However, the owner/operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. Source test results shall be submitted to the District within 60 days of conducting the tests. (BACT)

11. The owner/operator of the UGGPP shall submit all reports (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual. (Regulation 2-6-502)

12. The owner/operator of the UGGPP shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, emission calculation records, records of plant upsets and related incidents. The owner/operator shall make all records and reports available to District staff upon request. (Regulation 2-6-501)

13. The owner/operator of UGGPP shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall be subject to BAAQMD review and approval. (Regulation 1-501)

14. Within 30 days of the issuance of the Authority to Construct for the UGGPP, the owner/operator shall contact the BAAQMD Technical Services Division regarding requirements for the continuous monitors, sampling ports, platforms, and source tests required by Conditions 6 through 9, and 17. All source testing and monitoring shall be conducted in accordance with the BAAQMD Manual of Procedures. (Regulation 1-501)

15. The owner/operator of UGGPP shall submit an application for a major facility permit and a Phase II Acid Rain Permit (Title IV) to the APCO and to EPA within 12 months after the facility becomes subject to Regulation 2, Rule 6. Operation of the Gas Turbine S-1 without a Title IV operating permit may not occur sooner than 24 months after the application is received by the District. (Basis: Regulation 2-6-404.1 and Regulation 2-7)

16. Within 60 days of start-up of the UGGPP, the owner/operator shall conduct a District-approved source test on exhaust point P-1 to determine the corrected ammonia (NH3) emission concentration to determine compliance with Condition 4(c). The source test shall determine the correlation between the heat input rates of the gas turbine, A-1 SCR System ammonia injection rate, and the corresponding NH3 emission concentration at emission point P-1. The source test shall be conducted over the expected operating range of the turbine (including, but not limited to, minimum and 100 % load) to establish the range of ammonia injection rates necessary to achieve NOx emission reductions while maintaining ammonia slip levels. Continuing compliance with Condition 4(c) shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rates. (Basis: TRMP)

17. Within 60 days of start-up of the UGGPP and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust point P-1 while S-1 Gas Turbine is operating at maximum load to determine compliance with Conditions 4(a), 4(b), 4(d), 4(e), and 4(f) while S-1 Gas Turbine is operating at minimum load to

determine compliance with Condition 4(b) to determine compliance with the limits of Conditions 4, and to verify the accuracy and calibration of the continuous emission monitors required in Condition 6. (BACT, Offsets)

# V. Recommendation

The District will not authorize the installation or operation of any proposed new or modified source, the permitting of which is subject to the California Environmental Quality Act (CEQA), until all of the requirements of CEQA have been satisfied. The California Energy Commission (CEC) is the CEQA Lead Agency and the District is a CEQA Responsible Agency for this project.

Upon satisfaction of all CEQA requirements, the APCO has concluded that the proposed United Golden Gate Power Plant LLC power plant, which is composed of the permitted source listed below, complies with all applicable District rules and regulations.

Upon satisfaction of all CEQA requirements, we recommend to issue a Conditional Preliminary Determination of Compliance for the following equipment:

**S-1 Gas Turbine, General Electric LM 6000, natural gas fired, 51 MW net simple-cycle, maximum heat input rating is 450 MMBtu/hour; abated by A-1 Oxidation Catalyst, and A-2 Selective Catalytic Reduction System.**

_____ _____

Barry G. Young Date
Principal Air Quality Engineer

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